a WOW Lab BLUEPRINT

Colourific

Inquiry Approaches

Initial Inquiry

What is a hydrophobic molecule? A hydrophilic molecule?

A hydrophobic molecule is a molecule that is "afraid of water", so it is repelled by water. Hydrophobic molecules tend to be non-polar. A hydrophilic molecule is attracted to water, and can usually be dissolved in water. Hydrophilic molecules tend to be polar. Hydrophobic and hydrophilic molecules, such as oil and water, don't mix.

What is the difference between a chemical change and a physical change? Give examples for both types of change.

Physical changes are changes which do not alter the composition of the substance. Some examples of physical changes are melting ice cubes, shaping plasticine, and cutting paper. A chemical change is a change which alters the molecules of an object to form a new substance. Examples of chemical changes include rust forming on cars, burning logs in a fire and cooking pancakes.

Experimental Procedure Inquiry

What kind of milk would produce the most "swirling" of colour: skim, 1%, 2%, or whole milk? Why?

The whole milk will produce the most swirl. The more fat there is, the easier it is for the soap molecules to join up with a fat molecule. As the soap chases the fat molecules, it moves the water and nutrients that constitutes the rest of milk. Food colouring is dissolved in the hydrophilic part of milk and thus gets moved around.

Why didn't anything happen when water was added to the milk and food colouring?

Water does not have the physical properties necessary to disrupt the fat molecules in the milk, so it does not break the surface tension of the milk.

Was the *Swirly Whirly Milk* demonstration an example of a physical or a chemical change?

The disruption of the surface tension of milk is not a chemical change, but a physical change in the organization of the fat molecules in milk.

In-Depth Inquiry

What is soap?

Soap is the salt that comes from the reaction of a fatty acid and an alkali (such as sodium or potassium hydroxide). It has hydrophic properties on one end of the molecule and hydrophilic properties on the other end.

How does soap work?

When placed into water, soap molecules arrange themselves into clusters, called micelles, with the hydrophilic part of the molecules on the outside, in contact with the water, and the hydrophobic ends on the inside, not touching water at all. Fats and hydrophobic and so get trapped in the centre of the micelle.